

## Pre-lab 8: Population Genetics and Evolution

1. What is the Hardy Weinberg Law of Genetic Equilibrium, and what are the five conditions required to keep a population at HW Equilibrium?
2. Why is a large breeding population needed to maintain HW equilibrium? (explain genetic drift/bottleneck affect in your answer)
3. Why is random mating needed to maintain HW equilibrium?
4. Why do mutations alter HW equilibrium?
5. How does immigration and emigration alter allelic frequencies and HW equilibrium?
6. How does natural selection alter allelic frequencies and HW equilibrium?

7. A class of 12 AP biology students gathered the following data:

Initial class frequencies:

AA 3   Aa 6   aa 3

Calculate the initial p and q values

Final class frequencies:

AA 2   Aa 5   aa 5

Calculate the final p and q values:

8. If the frequency of two alleles in a gene pool is 90% *A* and 10% *a*, what is the frequency of individuals in the population with the genotype *Aa*?

9. In a population that is in Hardy-Weinberg equilibrium, the frequency of the homozygous recessive genotype is 0.09. What is the frequency of individuals that are homozygous for the dominant allele?

10. In humans, Rh-positive individuals have the Rh antigen on their red blood cells, while Rh-negative individuals do not. If the Rh-positive phenotype is produced by a dominant gene (*A*), and the Rh-negative phenotype is due to its recessive allele (*a*), what is the frequency of the Rh-positive allele if 84% of a population is Rh-positive?

11. Survey six individuals. Determine if these individuals have attached earlobes or detached earlobes:

Attached:

Detached: